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DRESDEN

WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE PROGRAM

ANNUAL REPORT - 1986

MAY, 1987

Ministry of the Environment
Ontario

J. Bishop, Director
Water Resources Branch

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ONTARIO MINISTRY OF THE ENVIRONMENT

Southwestern Region

DRESDEN WATER TREATMENT PLANT

Location:	749 Peel Street, P.O. Box 1120 Dresden, Ontario N0P 1M0 (519-683-6103)
Source:	Sydenham River
Design Capacity:	3.819 1000 M3/day
Operation:	Ministry of the Environment
Plant Superintendent:	C. Sherman
Ministry Region:	Southwestern Region Sarnia District Office Suite 109, 265 N. Front Street Sarnia, Ontario N7T 7X1 (519-336-4030)
Municipalities Served:	Dresden (2,504) (Canadian Canners)
Treatment Type:	Physical and chemical treatment consisting of coagulation, flocculation, and direct filtration and disinfection as well as activated carbon adsorption and taste and odour control.
Chemicals Used:	Prechlorination - chlorine Adsorption - powdered activated carbon Coagulation - dry alum with activated silica (sodium silicate and sodium bicarbonate) Post chlorination - chlorine Taste & odour - potassium permanganate.

DRESDEN WATER TREATMENT PLANT

EXECUTIVE SUMMARY
DRINKING WATER SURVEILLANCE PROGRAM, 1986

The Dresden Water Treatment Plant was sampled 6 times in 1986; results are given for raw and treated samples.

The parameters analyzed fall into several categories: physical parameters and general chemistry, bacterial parameters, metals, and organic substances including volatile and chloroaromatic substances and pesticides.

The discussion of results focuses on health-related parameters found in treated water:

(a) **Organic Substances**

Analysis was carried out for approximately 110 organic compounds. The only volatile compounds found, trihalomethanes (THMs) were always present in treated waters; the highest level recorded for total THMs was 134 ug/L.

Of all the pesticides analyzed for only atrazine was found, occurring in raw water three times and in treated water at 1135 ng/L only once.

No chlorophenolic compounds were found.

Only two other organic compounds were found at quantifiable levels in treated water; they each occurred on only one occasion, hexachloroethane at 17 ng/L and 2,3,6-trichlorotoluene at 66 ng/L.

(b) **Other Parameters**

The aesthetic ODWO* for organic nitrogen was exceeded in six treated water samples, while the ODWO both for colour and total solids was exceeded on two occasions. Of the other physical, general chemistry and microbiological parameters and metals analyzed, for which there are health-related ODWO, none exceeded the objectives, in treated water.

The results of these analyses are consistent with those obtained in other areas of the Great Lakes.

The treated water from the supply did not exceed any known health-related guidelines for organic substances applicable to drinking water.

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* The Ontario Drinking Water Objectives, revised 1983.

DRESDEN WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS
DRINKING WATER SURVEILLANCE PROGRAM, 1986

The Dresden Water Treatment Plant was sampled 6 times in 1986.

PARAMETER CATEGORY	TYPE OF SAMPLE RAW	TREATED*
1. GENERAL CHEMISTRY - includes anions such as sulphate, field analyses such as chlorine residual and physical parameters such as colour.		
Total number of parameters in category: 21		
- Total number of analyses completed	108	108
- Total number of positive results	108	87
- **Number of times guidelines exceeded**	**N/A**	**10**
Guidelines exceeded - aesthetic ODWO** for organic nitrogen (6)		
- " " " colour (2)		
- " " " total solids (2)		
2. METALS - includes metals such as copper and lead.		
Total number of parameters in category: 24		
- Total number of analyses completed	126	127
- Total number of positive results	70	62
- **Number of times guidelines exceeded**	**N/A**	**0**
3. BACTERIOLOGY - includes bacteria such as coliforms.		
Total number of parameters in category: 5		
- Total number of analyses completed	22	24
- Total number of positive results	20	6
- **Number of times guidelines exceeded**	**N/A**	**0**
4. VOLATILES - includes compounds such as benzene and toluene; also included in this category are trihalomethanes (5 parameters), acknowledged to be produced during water treatment.		
Total number of parameters in category: 29		
- Total number of analyses completed	167	166
- Total number of positive results	3	24
- **Number of times guidelines exceeded**	**N/A**	**0**
5. PESTICIDES -		
Total number of parameters possible in category: 65		
- Total number of analyses completed	185	185
- Total number of positive results	3	1
- **Number of times guidelines exceeded**	**N/A**	**0**
6. CHLOROAROMATICS AND CHLOROPHENOLS - includes a range of chlorinated organic compounds.		
Total number of parameters possible in category: 19		
- Total number of analyses completed	89	89
- Total number of positive results	1	2
- **Number of times guidelines exceeded**	**N/A**	**0**

* Total number of analyses completed will not always equal the number of parameters analyzed for multiplied by number of times the supply was sampled, because of accidents during shipping or analyses or analytical difficulties.

** Ontario Drinking Water Objective.

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario is a computerized drinking water information system. The objectives of this program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- an indication of treatment efficiency of plant processes.

Program

The DWSP began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. Water supply locations have been prioritized for surveillance, based primarily on such criteria as population density, probability of contamination and geographical location.

Once the data base becomes established, an assessment of monitoring requirements for the future will be made; monitoring will be continued at the initial locations at an appropriate level and further locations will be phased on to the program as resources permit. It is

estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operation characteristics in the plant at the time of sampling.

Assessments are carried out at all locations prior to sampling in order to acquire full plant process and distribution system details, and to designate (and retrofit if necessary) all sampling systems and locations.

Samples are taken of the raw (ambient water quality) and treated water at the treatment plants, and also in the distribution systems. In order to determine possible effects of distribution on water quality, both standing and flowing water in old and new sections of the distribution system are sampled. Sampling is carried out by Ministry of the Environment (MOE) Regional staff and/or Municipal personnel who have been trained in the applicable procedures. Comprehensive sampling kits and documented sampling procedures are made available to samplers. This ensures that samples are taken and shipped according to standard protocols and that field testing will supply reliable data. All analyses are carried out using approved documented procedures.

Data Reporting Mechanism

Final analytical results are usually received by the DWSP reporting system within 6 weeks of the time of sampling. At this time, printouts of the completed analyses are sent to the MOE District Officer and the appropriate MOE regional office, and are also retained by the DWSP co-ordinator. The DWSP is able to monitor analysis results and assess trends. Should the level of

a contaminant exceed a health-related Ontario Drinking Water Objective, action is required as outlined in the publication, Ontario Drinking Water Objectives.* The DWSP issues an "Action Alert" which notifies appropriate MOE and health authorities, and supplies a history of the occurrence of the contaminant in the water supply system concerned.

Parameters Analyzed

About one hundred and forty (140) different parameters are routinely measured on DWSP covering microbiological, organic and inorganic substances of concern, as well as process parameters.

Parameters included in the program are based on the following criteria:

- probability that the substance has the potential to cause problems (health-related or aesthetic);
- probability of occurrence in ambient water;
- availability of routine analytical and sampling methods for monitoring and control purposes;
- feasibility of control.

The range of parameters includes those having Ontario Drinking Water Objectives (ODWO), World Health Organization Drinking Water Guideline values, or other

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* Ontario Drinking Water Objectives, revised 1983, published by the Ontario Ministry of the Environment.

jurisdiction's drinking water objectives (e.g. State of California) as well as compounds of concern to other agencies such as the International Joint Commission, and U.S. Environmental Protection Agency.

The parameters monitored routinely during 1986 are shown in Table 1; this table also includes available guidelines which are appropriate for drinking water, and the analytical detection limit (the lowest concentration that can be detected by laboratory analysis) for each parameter.

Analyses for additional pesticides may be included on certain sampling dates; such additional pesticides are selected from the list shown in Table 1A. These analyses may be done on a seasonal basis, in response to an identified concern or because of a potential for occurrence in certain locations. Seasonal analyses for specified additional pesticides are normally carried out at times corresponding to maximal agricultural use or run-off periods, i.e. in spring and fall seasons.

Drinking Water Guidelines

The Ministry of the Environment published a revised edition of "Ontario Drinking Water Objectives" in 1983.

The primary purpose of drinking water objectives is the protection of the health of the public consuming the water. Aesthetic considerations may also provide a basis for drinking water objectives, since the water should be pleasant to drink. The control of such aspects of water quality as hardness, corrosiveness, etc. is also important. The limits set are considered to outline the minimum requirements necessary to fulfill the above objectives, and may be either health-related or related to aesthetic and other considerations.

Because this survey covered such a large number of parameters, many of them did not have an ODWO. In order to be able to compare data results to health guidelines, it was necessary to refer to objectives and guidelines developed by other jurisdictions.

The footnotes to Table 1 indicate the sources and derivation of the various guidelines.

TABLE 1: DRINKING WATER SURVEILLANCE PROGRAM, PARAMETERS ANALYSED

PARAMETER CATEGORY	Objective Guideline (1)	Detection Limit
CHEMISTRY:		
Conductivity	-	0.01 UMHO/CM
Hardness	-	0.5 mg/L
Calcium	-	0.1 mg/L
Magnesium	-	0.05 mg/L
Sodium	-	0.1 mg/L
Alkalinity		0.2 mg/L
pH	-	-
Fluoride	2.4 mg/L	0.01 mg/L
Chloride	250 mg/L	0.2 mg/L
Residue total (solids)	-	1 mg/L
Turbidity	1 FTU	.01 FTU
Phosphorus	-	0.002 mg/L
Phosphates	-	0.0005 mg/L
Nitrogen Total Kjeldahl	0.15 mg/L*	0.1 mg/L
Ammonium Total	-	0.05 mg/L
Colour	5 TCU	0.5 TCU
Nitrates Total	10 mg/L as N	.05 mg/L
Nitrite	1 mg/L as N	0.0005 mg/L
METALS:		
Uranium	0.02 mg/L(t)	0.002 mg/L‡
Iron	0.3 mg/L	0.002 mg/L
Manganese	0.05 mg/L	0.001 mg/L
Aluminum	-	0.003 mg/L
Arsenic	0.05 mg/L	0.001 mg/L
Barium	1 mg/L	0.001 mg/L
Boron	5 mg/L	0.02 mg/L
Beryllium	-	0.001 mg/L
Cyanide	0.2 mg/L	0.001 mg/L
Cadmium	0.005 mg/L	0.0003 mg/L
Cobalt	-	0.001 mg/L
Chromium	0.05 mg/L	0.001 mg/L
Copper	1 mg/L	0.001 mg/L
Mercury	1 µg/L	0.01 µg/L
Molybdenum	-	0.001 mg/L
Nickel	-	0.002 mg/L
Lead	0.05 mg/L	0.003 mg/L
Selenium	0.01 mg/L	0.001 mg/L
Strontium	-	0.001 mg/L
Vanadium	-	0.001 mg/L
Zinc	5 mg/L	0.001 mg/L
BACTERIOLOGY (RAW ONLY):		
Total Coliform MF	-	0
Total Coliform MF BKGD	-	0
Fecal Coliform	-	0
Standard Plate Count MF	-	0
(TREATED ONLY):		
Present/Absent (P/A) Test	Absent	Absent
Total Coliform MF BKGD	-	0
Fecal Coliform	0	0
Standard Plate Count MF	<500 orgs/mL	0

TABLE 1: DRINKING WATER SURVEILLANCE PROGRAM, PARAMETERS ANALYSED (cont'd)

PARAMETER CATEGORY	Objective Guideline (1)	Detection Limit	PARAMETER CATEGORY	Objective Guideline (1)	Detection Limit
VOLATILES:			CHLOROAROMATICS:		
1,1-Dichloroethylene	0.3 µg/L(h)	1.0 µg/l	Hexachloroethane	19000 ng/L(e)	1 ng/L
Dichloromethane	40 µg/L(c)	5 µg/L	1,3,5-Trichlorobenzene	10000 ng/L(y)	5 ng/L
TRS-1,2-Dichloroethylene	-	1 µg/L	1,2,4-Trichlorobenzene	15000 ng/L(y)	5 ng/L
1,1-Dichloroethane	-	1 µg/L	Hexachlorobutadiene	4500 ng/L(e)	1 ng/L
Chloroform	350 µg/L++	1 µg/L	1,2,3-Trichlorobenzene	10000 ng/L(y)	5 ng/L
1,1,1-Trichloroethane	1000 µg/L(c)	1 µg/L	2,4,5-Trichlorotoluene	-	5 ng/L
1,2-Dichloroethane	10 µg/L(h)	1 µg/L	2,3,6-Trichlorotoluene	-	5 ng/L
Carbon Tetrachloride	3 µg/L(h)	1 µg/L	1,2,3,5-Tetrachloro-benzene	-	1 ng/L
Benzene	10 µg/L(h)	1 µg/L	1,2,4,5-Tetrachloro-benzene	38000 ng/L(e)	1 ng/L
1,2-Dichloropropane	-	1 µg/L	2,6,A-Trichlorotoluene	-	5 ng/L
Trichloroethylene	30 µg/L(h)	1 µg/L	1,2,3,4-Tetrachloro-benzene	-	1 ng/L
Dichlorobromomethane	350 µg/L++	1 µg/L	Pentachlorobenzene	74000 ng/L(e)	1 ng/L
Toluene	100 µg/L(c)	1 µg/L	Total PCB's	3000 ng/L(t)	20 ng/L
1,1,2-Trichloroethane	6 µg/L(e)	1 µg/L			
Chlorodibromomethane	350 µg/L++	1 µg/L	PESTICIDES:		
Tetrachloroethylene	10 µg/L(h)	1 µg/L	Hexachlorobenzene	10 ng/L(h)	1 ng/L
Chlorobenzene	100-300 ng/L(h)*	1 ng/L	Heptachlor	3000 ng/L+++	1 ng/L
Trifluorochlorotoluene	-	1 µg/L	Aldrin	700 ng/L**	1 ng/L
Ethylbenzene	1400 µg/L(e)	1 µg/L	PP-DDE	d	1 ng/L
Ethylene Dibromide	0.02 µg/L(x)	1 µg/L	Mirex	-	5 ng/L
P-Xylene	620 µg/L(c)	1 µg/L	Alpha BHC	700 ng/L(c)	1 ng/L
M-Xylene	620 µg/L(c)	1 µg/L	Beta BHC	300 ng/L(c)	1 ng/L
O-Xylene	620 µg/L(c)	1 µg/L	Gamma BHC (Lindane)	4000 ng/L	1 ng/L
Total Trihalomethanes	350 µg/L++	3 µg/L	Alpha Chlordane	7000 ng/L***	2 ng/L
Bromoform	350 µg/L++	1 µg/L	Gamma Chlordane	7000 ng/L***	2 ng/L
1,1,2,2-Tetrachloroethane	1.7 µg/L(e)	1 µg/L	Oxychlordane	-	2 ng/L
1,4-Dichlorobenzene	400 µg/L(e)	1 µg/L			
1,3-Dichlorobenzene	400 µg/L(e)	1 µg/L			
1,2-Dichlorobenzene	400 µg/L(e)	1 µg/L			

TABLE 1: DRINKING WATER SURVEILLANCE PROGRAM, PARAMETERS ANALYSED (cont'd)

PARAMETER CATEGORY	Objective Guideline (1)	Detection Limit	PARAMETER CATEGORY	Objective Guideline (1)	Detection Limit
Pesticides (cont'd)					
OP-DDT	30000 ng/L(d)	5 ng/L			
PP-DDD	d	5 ng/L			
PP-DDT	d	5 ng/L			
Methoxychlor	100000 ng/L	5 ng/L			
Heptachlor Epoxide	3000 ng/L+++	1 ng/L			
Endosulfan 1	74000 ng/L(ea)	2 ng/L			
Dieldrin	700 ng/L**	2 ng/L			
Endrin	200 ng/L	4 ng/L			
Endosulfan 2	74000 ng/L(ea)	4 ng/L			
Endosulfan Sulphate	-	4 ng/L			
Octachlorostyrene	-	1 ng/L			
Toxaphene	5000 ng/L	PA(xx)			

Footnotes:

(l) = Ontario Drinking Water Objectives (ODWO) for drinking water, unless noted.

(t) = ODWO Interim maximum acceptable concentration (IMAC) for drinking water.

(c) = California State Department of Health Action Level for drinking water.

(d) = ODWO for DDT (contains other isomers such as OPDDT and PPDDT).

(e) = US EPA ambient guideline; guideline levels when it is assumed that untreated water and fish and shellfish are consumed from the same body of water.

(ea) = United States Environmental Protection Agency (US EPA) ambient level for endosulfan (contains other isomers).

(h) = World Health Organization (WHO) guideline for drinking water.

(h)* = World Health Organization (WHO) Odour Threshold for drinking water.

(x) = State of Florida, maximum contaminant level for drinking water.

(xx) = the presence of toxaphene is detected in scan used; positive samples would be quantified by special additional analysis.

(y) = New York State (Taste and Odour) proposed drinking water guideline.

++ = total Trihalomethanes.

+++ = combined total; Heptachlor and Heptachlor Epoxide.

* = total Kjeldahl Nitrogen minus Ammonia Nitrogen.

** = total of Aldrin and Dieldrin.

*** = Chlordane is a mixture of alpha and gamma isomers.

‡ = Analysis changed to mass spectrometry method in mid-1986, detection limit 0.0001 mg/L.

TABLE 1A: DRINKING WATER SURVEILLANCE PROGRAM SPECIAL PESTICIDES

Dicamba
2,4-D
2,4-DB
2,4-DP
2,4,5-T
Silvex (2,4,5-TP)
Picloram
2,4,6-Trichlorophenol
2,4,5-Trichlorophenol
2,3,4-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,3,4,5-Tetrachlorophenol
Pentachlorophenol
Diazinon
Dichlorvos
Dursban
Ethion
Guthion
Malathion
Mevinphos
Methyl Parathion
Methyl Trithion
Parathion
Phorate (Thimet)
Reldan
Ronnel
Carbofuran
Propoxur
IPC
Aminocarb
CIPC
Eptam
Benonyl
Bux
Diallate
Sevin
Sutan
Propazine
Atrazine
Simazine
Sencor (metribuzin)
Bladex (Cyanazine)
Prometone
Ametryne
Prometryne
Atratone
Alachlor
Metolachlor

RESULTS AND DISCUSSION

The parameters analyzed fall into several categories: physical parameters and general chemistry (chemistry), bacterial parameters, metals, and organic substances including volatile and chloroaromatic substances and pesticides. Many of the substances analyzed for are naturally-occurring or treatment by-products.

The results of analysis of raw and treated water samples are shown in Tables 2 and 3. Table 2 shows the categories of parameters analyzed, as well as the total number of analyses which were completed in each category for both raw and treated water samples and the total number of positive results which were obtained. Table 3 lists the sampling dates and the numerical values for each parameter for which analysis produced a positive (quantifiable) result.

The Dresden Water Treatment Plant was sampled six times in 1986.

(a) Non Organic Substances

There are 195 positive results of 216 reported analyses for physical parameters, such as pH and temperature and general chemistry tests. The results of these tests are used as an indication of the analytical validity and integrity of the samples, the general characteristics of the water, and as a guide to making an assessment of the treatment process; they may also indicate whether any changes occur during the time elapsing between sampling and actual analysis. Colour exceeded the ODWO of 5 TCU on two occasions in the treated water (May 25 and December 15, 1986). Organic nitrogen (total Kjeldahl nitrogen minus ammonia nitrogen)

exceeded the ODWO in treated water on all 6 sampling occasions, the highest level being 0.49 mg/L on May 26, 1986. Levels of organic nitrogen above the ODWO can result in taste and odour problems. The total solids levels, both on May 26 and June 21, 1986, were marginally higher than the ODWO of 500 mg/L. Colour, organic nitrogen and total solids are all parameters related to the aesthetic quality of drinking water; and they are probably indicative of a fairly high level of organic loading in the source water, as might be expected on a river system in the agricultural area.

Positive results were obtained for 26 analyses for bacterial parameters out of a total number reported of 46. These bacterial tests include those for species of paramount importance from a public health point of view, and those which assess the general bacteriological quality and characteristics of the water; by this means, a measure is obtained of the overall efficiency of water treatment processes. Positive results were obtained for treated water samples for standard plate count (a measure of the total number of bacteria in a water sample), ranging from 2 organisms per mL to 5 organisms per mL; the ODWO recommend that treated water not exceed 500 organisms per mL for standard plate count.

Analyses of 253 tests for metals in the water samples were reported; of these 132 were positive results. Metals can occur naturally and most are generally regarded as being ubiquitous. However, some may be present in water as a result of industrial or other discharges. A small number of metals have public health significance.

Of those parameters discussed above for which there are health-related ODWO, none exceeded the Objectives except for organic nitrogen, colour and total solids. Nor did the levels exceed any guidelines for drinking water set by other jurisdictions, such as the U.S. Environmental Protection Agency (US EPA), the World Health Organization (WHO) and Health & Welfare, Canada (H&W, Canada). Furthermore, the results of these analyses are consistent with those obtained in other areas of the Great Lakes.

(b) Organic Substances

Of a total of 333 analyses for volatile organic compounds, only 27 were positive; 24 of these were from treated water samples and were all due to the presence of trihalomethanes. Due to the practice of prechlorination and an error in the sampling technique, low levels of chloroform appeared in the raw water, on April 28, 1986 and May 26, 1986.

Trihalomethanes (THMs) are acknowledged to be produced during the water treatment process and will almost always only occur in treated waters. Trihalomethanes are comprised mainly of chloroform, chlorodibromomethane and dichlorobromomethane with bromoform occurring occasionally. Results are reported for the individual compounds as well as for their sum, which is expressed as total trihalomethanes (total THM). The ODWO for total THM is 350 ug/L; this level was not exceeded in any of the water samples included in this report, the highest level recorded being 134 ug/L on April 28, 1986.

Two hundred and seventy six (276) tests were carried out for twenty three different pesticides; none was found above trace levels. Seven special pesticides (dicamba, 2,4-D propionic acid, 2,4-D, Silvex, 2,4,5-T, 2,4-DB and picloram) were analyzed for in both raw and treated water on two occasions (March 17, 1986 and April 28, 1986). This analysis is carried out only once or twice a year at each supply, on a seasonal basis, to correspond to the use and/or loss of such pesticides on agricultural land. As of March 17, 1986, eight pesticides (propazine, atrazine, simazine, Sencor, Bladex, prometone, ametryne and prometryne) were analyzed for monthly, with the exception of June 21, 1986. Atratone was added to the above list for the May and December sample dates. Metolachlor and alachlor were analyzed for on December 15, 1986. Only atrazine, which occurred in both raw and treated water on May 26, 1986 was found above trace levels at 1410 ng/L and 1135 ng/L, respectively. It also occurred in raw water only on April 28, 1986 and December 15, 1986 at 740 ng/L and 610 ng/L, respectively. The interim guideline concentration for drinking water (H&W Canada) for atrazine is 46000 ng/L.

Only two other organic compounds were found at quantifiable levels in treated water at this supply; these were both chloroaromatics, thus providing the 3 positive results out of a total of 156 analyses in this category. Hexachloroethane was found in raw and treated water at 24 ng/L and 17 ng/L, respectively; while no ODWO exists for this compound, the US EPA has recommended an ambient water quality criteria (assuming both fish and untreated water are consumed from the same water source over a lifetime) of 19000 ng/L.

The chemical 2,3,6-trichlorotoluene was detected at 66 ng/L, slightly above the quantifiable detection limit of 50 ng/L on only one occasion. It has been found in treated water at other supplies, as have other trichlorotoluene isomers (Drinking Water Survey, St. Clair-Detroit River Area*). There is no drinking water guideline for this substance.

Six chlorophenolic compounds (2,4,6-trichlorophenol; 2,4,5-trichlorophenol; 2,3,4-trichlorophenol; 2,3,5,6-tetrachlorophenol; and 2,3,4,5-tetrachlorophenol) were analyzed for on March 17, 1986 and April 28, 1986. An additional chlorophenolic compound (pentachlorophenol) was analyzed for on March 17, 1986. None of these parameters was found in either the raw or treated water.

Review of these results, along with information from other DWSP sites*, would indicate that certain chlorinated compounds, such as trichlorotoluenes appear more frequently in the treated water than in the raw water. The Ministry of the Environment (MOE) made a submission to the liaison group of the Canadian Council of Resource and Environment Ministries and the Federal/ Provincial Advisory Committee on Environmental and Occupational Health (ACEOH) to consider setting drinking water guidelines for these compounds. The information will be forwarded to the ACEOH sub-committee on drinking water guidelines; MOE provides a representative for this sub-committee.

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* Drinking Water Survey, St. Clair-Detroit River Area. Update August 1986. Ontario Ministry of the Environment.

CONCLUSIONS

The data reveal that for metals, inorganic ions, and bacterial parameters, raw water values are frequently in the detectable range; some of metals and inorganics are also found in treated water. The levels of metals, inorganic compounds, and bacteria are consistent with those found in other water supplies in the province.

For the organic compounds, most are below detection levels, even though the most sophisticated equipment available was employed in the chemical analysis.

ODWO have not been established for some of the compounds analyzed; for these few compounds, use was made of appropriate guidelines set by other agencies, such as the World Health Organization, the US Environmental Protection Agency, Health and Welfare Canada or other agencies. None of these guidelines was exceeded.

The report identifies some compounds detected for which drinking water guidelines are not yet available. These compounds have been submitted for consideration for setting drinking water guidelines to the appropriate expert groups by the Ministry of the Environment.

The treated water at this supply did not exceed any known, health-related guidelines applicable to drinking water.

TABLE 2

DRESDEN WATER TREATMENT PLANT

	PARAMETER GROUP	TYPE OF SAMPLE RAW	TREATED
1.	GENERAL CHEMISTRY		
	- Total samples	108	108
	- Total positives	108	87
2.	METALS		
	- Total samples	126	127
	- Total positives	70	62
3.	BACTERIOLOGY		
	- Total samples	22	24
	- Total positives	20	6
4.	VOLATILES		
	- Total samples	167	166
	- Total positives	3	24
5.	PESTICIDES		
	- Total samples	138	138
	- Total positives	0	0
6.	CHLOROAROMATICS		
	- Total samples	78	78
	- Total positives	1	2
7.	CHLOROPHENOLS		
	- Total samples	11	11
	- Total positives	0	0
8.	SPECIAL PESTICIDES		
	- Total samples	47	47
	- Total positives	3	1

Table 3

DRESDEN WATER TREATMENT PLANT DWSP RESULTS

02/17/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/18	86/03/17	86/04/28	86/05/26	86/06/21	86/12/15
ALKALINITY	MG/L-CAC	R	244.00	138.40	212.00	214.00	230.40	236.20
		T	229.40	103.20	196.40	177.50	181.20	216.80
ALUMINUM	MG/L-AL	R	.330	3.100	.570	1.100	1.300	.620
		T	.093	.330	.007	.086	.055	.220
ARSENIC	MG/L-AS	R		.010				
		T						
BARIUM	MG/L-BA	R	.032	.031	.034	.041	.041	.034
		T	.012	.016	.028	.035	.032	.012
BORON	MG/L-BO	R	.030			.040	.050	.040
		T	.020	.040	.110	.040	.050	.050
CALCIUM	MG/L-CA	R	106.00	59.000	86.000	98.800	102.00	102.00
		T	108.00	61.000	85.900	98.600	101.00	102.00
CADMIUM	UG/L-CD	R		.200				
		T						
CHLORIDE	MG/L-CL	R	24.000	13.900	20.300	30.500	24.500	28.500
		T	26.800	16.700	22.350	33.500	27.500	30.000
COLOUR	HZU	R	22.000	3.500	19.500	26.500	19.000	20.500
		T	2.500	3.500	5.000	5.500	3.000	5.500
CONDUCTIVITY	UMHO/CM	R	670.00	398.00	560.00	635.00	639.00	657.00
		T	707.00	451.00	580.00	561.00	669.00	701.00
COBALT	MG/L-CO	R	.001	.004				
		T			.002	.001		

Table 3 (cont'd)

DRESDEN WATER TREATMENT PLANT DWSP RESULTS

02/17/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/18	86/03/17	86/04/28	86/05/26	86/06/21	86/12/15
CHROMIUM	MG/L-CR	R	.003	.008		.001	.001	001
		T	.003	.002				
COPPER	MG/L-CU	R	.012	.012	.007	.005	.005	005
		T	.009	.006	.002	.002	.002	002
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	R	79.000	112.00	8.000			110.00
		T						
IRON	MG/L-FE	R	.340	3.700	.790	1.200	1.400	.620
		T	.008	.057	.002	.002	.009	.014
FLUORIDE	MG/L-F	R	.130	.160	.140	.150	.160	.150
		T	.100	.080	.130	.100	.100	.100
FIELD COMBINED CHLORINE RESIDUAL	MG/L-CL	R						
		T	.300	.200	1.000	.100	.250	.100
FIELD FREE CHLORINE RESIDUAL	MG/L-CL	R						
		T	.900	.900	.580	1.000	1.000	1.000
FIELD TOTAL CHLORINE RESIDUAL	MG/L-CL	R						
		T	1.200	1.100	1.200	1.100	1.250	1.100
FIELD PH		R	7.700	7.400		7.900	8.000	8.100
		T	7.400	6.700		7.100	7.200	7.600
FIELD TEMPERATURE	DEG.C	R	3.000	4.000	13.000	17.000	24.000	1.000
		T	1.500	2.000	12.000	17.000	23.000	2.000
FIELD TURBIDITY	FTU	R	17.000	115.00	28.000	30.000	38.000	26.000
		T	.650	.520	.280	.320	.380	.480
HARDNESS	MG/L-CAC	R	343.00	190.10	279.50	320.00	325.00	327.00
		T	348.00	192.70	278.50	319.50	322.50	324.50

Table 3 (cont'd)

DRESDEN WATER TREATMENT PLANT OWSP RESULTS

02/17/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/18	86/03/17	86/04/28	86/05/26	86/06/21	86/12/15							
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	R	500.00			1200.0		530.00							
		T	2.000	5.000	2.000			5.000							
MAGNESIUM	MG/L-MG	R	19.000	10.400	15.800	17.800	17.000	17.600							
		T	19.000	9.800	15.600	17.900	16.900	17.000							
MANGANESE	MG/L-MN	R	.021	.068	.041	.050	.049	.020							
		T	.012	.045	.002	.009	.003	.012							
MOLYBDENUM	MG/L-MB	R													
		T		.001		.001	.002	.001							
SODIUM	MG/L-NA	R	11.000	5.500	9.100	10.400	8.900	11.100							
		T	17.500	14.500	15.300	13.800	12.200	17.400							
NICKEL	MG/L-NI	R	.001	.007	.002	.003	.002								
		T			.003										
AMMONIUM TOTAL	MG/L-N	R	.064	.192	.050	.066	.030	.038							
		T		.010	.020	.010	.034								
NITRITE	MG/L-N	R	.035	.054	.018	.082	.016	.039							
		T		.002	.002	.003	.005								
TOTAL NITRATES	MG/L-N	R	4.850	4.600	3.520	9.280	5.980	6.520							
		T	4.850	4.540	4.040	9.180	8.030	6.520							
NITROGEN TOTAL KJELDAHL	MG/L-N	R	.550	1.170	.730	.910	1.000	.590							
		T	.340	.330	.420	.500	.420	.370							
ATRAZINE	NG/L	R			740.00	1410.0		610.00							
		T				1135.0									

Table 3 (cont'd)

DRESDEN WATER TREATMENT PLANT DWSP RESULTS

02/17/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/18	86/03/17	86/04/28	86/05/26	86/06/21	86/12/15							
LEAD	MG/L-PB	R		.007											
		T													
PH		R	7.880	8.250	8.460	8.270	7.170	8.370							
		T	7.380	7.810	8.220	7.750	7.670	8.160							
PHOSPHORUS FIL REACT	MG/L-P	R	.027	.097	.017	.040	.035	.036							
		T													
PHOSPHORUS TOTAL	MG/L-P	R	.043	.206	.048	.089	.115	.058							
		T													
TOTAL SOLIDS	MG/L	R	462.00	373.00	444.00	531.00	521.00	448.00							
		T	482.00	297.00	202.00 CRO	502.00	518.00	465.00							
STRONTIUM	MG/L-SR	R	.230	.130	.200	.210	.200	.220							
		T	.210	.110	.200	.220	.190	.190							
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	R	3900.0	3200.0 A3C	18.000 A3C		1500.0 A3C	1700.0							
		T													
TOTAL COLIFORM BACKGROUND MF	CT/100ML	R	4600.0	129000	8000.0	0000.0	570000	3000.0							
		T					1.000	1.000							
TURBIDITY	FTU	R	11.000	115.00	35.000	48.000	57.000	16.700							
		T						.220							
URANIUM	MG/L-U	R			.002	.003	.003								
		T			.002	.002									
VANADIUM	MG/L-V	R	.006	.007	.001	.003	.003	.001							
		T	.007	.001											

Table 3 (cont'd)

DRESDEN WATER TREATMENT PLANT DWSP RESULTS

02/17/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/18	86/03/17	86/04/28	86/05/26	86/06/21	86/12/15						
CHLOROFORM	UG/L	R			11.000	3.000								
		T	55.000	53.000	110.00	82.000	93.000	55.000						
DICHLOROBROMOMETHANE	UG/L	R												
		T	20.000	8.000	21.000	16.000	27.000	18.000						
CHLORODIBROMOMETHANE	UG/L	R												
		T	10.000	2.000	3.000	1.000	7.000	3.000						
HEXACHLOROETHANE	NG/L	R			24.000									
		T			17.000									
236 TRICHLOROTOLUENE	NG/L	R												
		T				66.000								
TOTAL TRIHALOMETHANES	UG/L	R			11.000									
		T	85.000	63.000	134.00	99.000	127.00	76 000						
ZINC	MG/L-ZN	R	.008	.015	.008	.005	.012							
		T	.006	.004	.003	.005	.011	.002						